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COMMONWEALTH OF AUSTRALIA.

PATENT SPECIFICATION

17,025/56

Complete Specification Lodged ..... 27th March, 1956.
Application Lodged (No. 17,025/56) ..... 27th March, 1956.

Applicants (Actual Inventors)..... Franz Plasser and Josef Theurer.

Convention Application
(Austria, 13th April, 1955)

Complete Specification Published ..... 27th September, 1956.
Complete Specification Accepted ..... 7th February, 1958.

Classification 98.4.

Drawings (2 sheets) attached.

COMPLETE SPECIFICATION.

"MOBILE APPARATUS FOR TREATING, MORE PARTICULARLY CLEANING, BALLAST BED IN RAILWAY PERMANENT WAY CONSTRUCTION."

The following statement is a full description of this invention, including the best method of performing it known to us: -

The present invention relates to a mobile apparatus for treating and more particularly cleaning, ballast in railway permanent for construction.

Tracked levelling machines or bulldozers have been known for some time past, these being used in road construction for levelling natural terrain or ballast underlayers. Such machines include an endless-track tractor carrying a front plate which is fixed to a pivotable support frame and by means of which the machine pushes before it the material which is to be treated. Similar levelling apparatus is also known in railway permanent-way construction for levelling ballast beds, and in this case the levelling plate slides along gauge rails arranged longitudinally of the bed of ballast, so that such guiding ensures accurate positioning of the rails both in straight stretches and in curves. The

levelling plates of these machines are so constructed and are arranged so steeply that they push the ballast being treated not to the side but in front of them in the forward direction, so as to obviate the risk of the gauge rails being shifted by lateral ballast pressure. On the other hand, however, the disadvantage must be taken into account that the heap of ballast which accumulates in front of the plate had to be removed from time to time with the help of additional workers, so as to enable the levelling apparatus to continue to move in the working direction.

The present invention relates to an apparatus which does not have the aforesaid disadvantages when in use and which, if constructed appropriately, can also be used with great advantage for cleaning or other further treatment of the cleared-away ballast.

According to the present invention the apparatus is constructed substantially in the manner of a tracked levelling machine, and is equipped with an inclined front plate bounded at each side by side cheeks or side plates, so that when the apparatus is advancing, the ballast collected by the bottom or front edge of the front plate slides over the inclined surface of the plate to the rear, where it can be subjected to further treatment, e.g., cleaning.

In the simplest case, the further treatment of the ballast can consist, for example, in causing the ballast passing over the sloping front plate to be discharged laterally or to the rear of the apparatus, or to be loaded on to other haulage means, e.g. vehicles, conveyor belts and so on. As already mentioned, however, the apparatus according to the invention can also be constructed with great advantage as a ballast cleaning machine, which is distinguished from known cleaning machines by its simple and economical construction and because it requires little space.

It is true that there is a known ballast cleaning machine for railway permanent-way construction which consists of three vehicles coupled one after the other, an endless-track tractor which tows a vehicle with a vertically-adjustable front plate inclined to the plane of the track and with side plates, the ballast travelling upwards over the front plate when the vehicle moves forwards, and then being fed over the top edge of the plate to a conveyor belt arranged on the third vehicle and to a cleaning device, whereupon it is finally deposited to the rear of the third vehicle on to the ground-work. This known machine was of very considerable length, however, and consisted of a great number of components, so that it was correspondingly very liable to breakdowns; a fairly large number of workers was required to operate it and it was extremely difficult to supervise the working of such a machine. Finally, there were also difficulties in using this machine in the case of rail

curves of small radius.

In designing an apparatus according to the present invention as a ballast cleaning machine all the difficulties mentioned above can easily be avoided.

In one constructional form of the invention, a screen, preferably a vibrating screen, is arranged behind the upper edge of the front plate. In this way guide plates or the like can be arranged at the underside of the screen so that material, which has been sifted out when the ballast is cleaned can be guided to a conveyor belt which travels transversely to the direction of movement of the whole apparatus and which discharges the material laterally of the track. If the screen is inclined from the top edge of the front plate downwards, the material passing from the front plate to the screen moves downwards owing to its own weight over the screen surface and in the rearward direction (see in the direction of travel of the apparatus). The rear edge of the screening surface can then be followed without a break by chute-like guide plates by means of which the cleaned ballast is discharged laterally or rearwardly of the vehicle.

In another and also very advantageous constructional form of the invention however, it is possible also to replace the chutes by a further conveyor belt arranged immediately behind the screen, so as to receive the already cleaned ballast from the screen for discharging to the left, right or rear of the apparatus as desired. Conveying to left or right is controlled by simply switching over the driving motor, e.g. an electric motor. The conveyor belts may also be swingable, adjustable or of variable length, so as to be adaptable to conditions which may vary according to requirements.

Further features of the invention will be explained with reference to the accompanying drawings, which illustrate, by way of example, various constructional forms of the invention. In the drawings:-

Fig. 1 is a plan view of one constructional form of the invention;

Fig. 2 is a partial sectional view through the apparatus on the line II-II in Fig. 1;

Fig. 3 is a sectional view on the line III-III in Fig. 2, illustrating the construction of the front plate.

Figs. 4 and 5 show another constructional form of the propulsion means associated with the front plate, Fig. 4 being a sectional view on the line IV-IV in Fig. 5, and Fig. 5 a sectional view on the line V-V in Fig. 4;

Fig. 6 also shows a further constructional form of the propulsion means; and

Fig. 7 shows a modified constructional form of the whole apparatus, wherein the cleaned ballast is conveyed to, and deposited at the rear of, the apparatus.

Referring first to Figs. 1 and 2:

The vehicle body 1 is constructed as an endless-track bulldozer tractor. Known, mass-produced bulldozer tractors can be used, without special requirements, as the vehicle body, and converted at low cost into ballast shifting and cleaning machines according to the invention.

A support frame 2, which is connected in known manner to the vehicle body 1 so as to be upwardly swingable, carries a front plate 3 which slopes upwards at a shallower angle with respect to the ground than is usual with bulldozers, so that the ballast taken up by the lower edge 3' of the plate 3 under the influence of the forward thrust exerted by the vehicle 1, can travel over the sloping surface of the plate 3 in the upward direction.

Upright plates 4 are provided as side plates one at each side of the sloping front plate 3 and they prevent the ballast which has been taken up from slipping off to the side. The ballast thus conveyed over the front plate 3 then travels upwards completely over the top edge of the sloping face of the front plate on to the surface of a vibrating screen 5 and slips slowly rearwards over the rearwardly inclined screening surface where it is divided into two parts by the guide plates of two chutes 6, which guide plates are arranged in wedge-shaped formation. The ballast is thus deposited by the chutes 6 laterally of the ground-work. It is also possible, of course, for one or other of the two chutes 6 to be temporarily blocked if so desired, so that the ballast material will then be deposited to one side only.

As Fig. 3 shows more clearly, the front plate 3 is provided laterally with rollers 7 which are rotatably mounted in laterally-projecting brackets 8 and roll along gauge rails 9, which are laid on longitudinal sleepers at each side of the ballast bed 18 which is to be cleared. The gauge rails 9 guide the plate 3 both in the vertical and in the lateral directions. Moreover, the front plate 3 is adapted to be adjusted vertically by means of the pivotable support arm 2, so that in some cases it is possible to dispense with additional guiding by the gauge rails 9. If such gauge rails are provided, however, fine adjustment of the clearing edge 3' can also be achieved by making the brackets 8 vertically adjustable.

As shown in Fig. 3 the lower edge (or front edge) 3' of the front plate 3 is advantageously higher in the middle than it is in the two side regions, so that the underlayer of the ballast bed 18 remaining

after the top layers of ballast have been cleared away is given a somewhat cambered profile. By giving the ballast underlayer 18 a cambered profile similar to the profile of a road surface, lateral discharge of rain and melted snow water over the sloping surface at each side is greatly facilitated. The part of the ballast bed which has been referred to above as the "underlayer" does not need to be cleaned and, as a result, since it is soiled, it is less permeable to water and is denser than the upper region of the ballast which is cleaned, and forms a layer of its own for the upper and loose ballast layer. As a result, the total quantity of ballast to be cleaned is reduced.

A conveyor belt 10, which is arranged behind the top edge of the front plate 3, travels transversely to the direction of movement of the apparatus and is driven by a motor 14 (Fig. 1). The conveyor belt 10 extends at one side substantially beyond the width of the front plate 3, so that the material conveyed by the conveyor can be deposited more or less far outside the region of the track.

The above mentioned vibrating screen 5 is arranged above the conveyor belt 10 and from the screen the screened material, i.e. the refuse, is conveyed to the conveyor belt by means of guide plates 15. The eccentric shaft 11 of the vibrating screen 5 is driven by an electric motor 13, which is connected to the eccentric shaft 11 by a belt drive 12, the frame of the vibrating screen 5 resting or oscillating on springs 16.

Briefly, the apparatus operates as follows. The ballast 18 which is taken up by the front edge 3' of the front plate 3 and is to be fed into the apparatus for cleaning, travels upwards over the sloping face of the plate 3 under the effect of the forward pressure exerted by the vehicle 1, and travels over the top edge of said front plate on to the sloping surface of the screen 5. On the vibrating screen 5 the dirt is separated from the ballast and passes by way of the guide plates 15 on to the conveyor belt 10, which deposits the dirt at the side of the track. By reason of gravity, the cleaned stones of the ballast travel along the sloping screen 5 to the chutes 6 and are deposited by the chutes outside the rails 9 and the stones can be shifted from outside the rails to be re-made into a fresh road-bed.

Figs. 4 and 5 illustrated another constructional form of the members which are associated with the plate 3 for facilitating movement of the plate. In this construction in plate of the laterally -projecting rollers 7 mounted in brackets as in Figs. 1 and 2, there are rollers 7' (or a single such roller), which are arranged and mounted inside the front plate itself. The rollers are mounted on the support frame 8' of the front plate 3 and the rollers roll on the already levelled ballast 18,

the correct height of which is determined only by swinging the support arms 2 for the front plate 3, so as to avoid the time-wasting arrangement of special guide rails.

A similar effect is achieved in the modification shown in Fig. 6, wherein the front plate 3 is provided at its underside with a slider shoe 7'', which slides along the ballast 18 which has already been levelled to the proper height and helps to relieve the support arms 2 of load.

In the further alternative constructional form of the apparatus which is illustrated in Fig. 7, a front plate 3 constructed as shown in Fig. 6 is provided with a front edge 3', side plates 4 and a slider shoe 7'' at its underside. The construction of the vibrating screen 5 and the conveyor belt 10, and of all the associated parts, is in every way similar to the constructional form illustrated in Figs. 1 and 2. The ballast cleaned on the screen 5, however, passes by way of short chutes 6' to conveyor belts 19 which are mounted at each side of the vehicle 1 on supports 20, and the ballast is conveyed to the rear by the conveyor belts 19. In order that the ballast can be distributed uniformly at the rear, pivotable chutes 22 are provided at the rear ends of the conveyor belts 19 and are swingable about pivot pins 21. In other respects, the apparatus operates in the same way as the constructional form shown in Figs. 1 and 2.

Numerous developments of this apparatus, which have not been mentioned particularly in the above description, are of course possible within the scope of the invention as defined in the following claims. More particularly, there are many possibilities for the further treatment, further conveyance , and processing of ballast taken up by the front plate. In this sense the apparatus according to the invention is suitable for any treatment of ballast, such as, for example, use in conjunction with additional devices for mixing with fresh ballast, for making a new ballast bed from old ballast, for sorting, for reducing the size of the ballast material, and so on.

Driving power for the mechanically-driven parts of the apparatus, more particularly for the vibrating screen or its eccentric shaft, and also for the conveyor belts, is advantageously provided by individual electric motors, which are fed by a unit such as a diesel generator mounted on the vehicle body, for instance on the tractor, and the said driving power may also be used through appropriate gearing to propel the tractor.

The claims defining the invention are as follows:

1. A mobile apparatus for treating, more

particularly cleaning, ballast in railway permanent-way construction, comprising a vehicle which carries a front plate having a sloping face and swingably arranged on the front of the vehicle, the front plate being bounded at each side by side plates and its sloping face forming such a shallow angle with respect to the ground that the ballast which is taken up by the front edge of the front plate when the vehicle is driven forwards slides over the sloping face to the rear where it can be subjected to further treatment, e.g., cleaning. (13th April, 1955)

2. Apparatus according to Claim 1, wherein the said vehicle is constructed in the manner of an endless-track tractor. (13th April, 1955)

3. Apparatus as claimed in claim 1 or 2, wherein the said side plates are substantially upright. (13th April, 1955)

4. Apparatus according to claim 1, 2 or 3, wherein the lower edge of the front plate is higher in the middle than at the two side regions, so that the underlayer of ballast bed remaining after the upper layer has been cleared is given a cambered profile. (13th April, 1955)

5. Apparatus according to any of claims 1 to 4, wherein the front plate is provided at each side with rollers which roll along lateral gauge rails serving to guide the front plate and, if required, arranged at each side of the ballast bed which is to be cleared or cleaned. (13th April, 1955)

6. Apparatus according to claim 5, wherein the rollers are vertically adjustable so as to allow the leading edge of the front plate to be effective at various heights as desired. (13th April, 1955)

7. Apparatus according to any of claims 1 to 4, wherein at the underside of the front plate, rollers, cylinders or the like, are arranged on which the front plate can roll along the already-cleared portion of the ballast bed. (13th April, 1955)

8. Apparatus according to any of claims 1 to 4, wherein at the underside of the front plate there is arranged a slider shoe or the like by means of which the front plate can slide over the already-cleared portion of the ballast bed. (13th April, 1955)

9. Apparatus according to any one of the preceding claims, wherein behind the front plate there is provided a conveyor belt which extends parallel to the top edge of the front plate and transversely to the direction of movement of the whole apparatus and which also extends laterally beyond the width of the front plate, so as to make it possible to deposit laterally the material which has been passed over the front plate. (13th April, 1955)

10. Apparatus according to claim 9 for cleaning ballast, wherein the top edge of the front plate is followed by a screen, preferably a vibrating screen, which is arranged above the conveyor belt, and at the underside of which guide plates or the like may be arranged for guiding to the conveyor belt the material screened out when the ballast is cleaned, the conveyor belt then delivering the material laterally of the apparatus . (13th April, 1955)

11. Apparatus according to claim 10, wherein the screen slopes downwards to the rear from the top edge of the front plate, so that the materials passed on to the screen by the front plate travel downwards and rearwards over the screen under the effect of their own gravity. (13th April, 1955)

12. Apparatus according to any of claims 9 to 11, wherein the rear end of the screening surface is followed directly by chute-like guide plates or the like, by means of which the already-cleaned ballast is discharged laterally and/or rearwardly from the screening surface. (13th April, 1955)

13. Apparatus according to any of claims 9 to 11, wherein immediately following the screen, further conveyor belts are provided by means of which the already-cleaned ballast from the screening surface is carried along and can be discharged, as desired, to the left, right, or rear of the apparatus. (13th April, 1955)

14. Apparatus according to any of claims 10 to 13 , wherein the screen is a vibrating screen and the latter is driven by an eccentric shaft, which latter, and also the drive for the conveyor belt, or conveyor belts, are arranged on the support frame of the front plate and consist of electric motors which are supplied from a unit e.g. a generator, mounted on the vehicle body. (13th April, 1955)

15. A mobile apparatus for treating, more particularly cleaning, ballast in railway permanent-way construction, substantially as described with reference to Figs. 1, 2 and 3, Figs. 4 and 5, Fig. 6 or Fig. 7 of the accompanying drawings. (13th April, 1955)

PHILLIPS, ORMONDE, LE PLASTRIER & KELSON
Patent Attorneys for Applicants.

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References:-

Serial No.	Application No.	Classification
--------	10,244/19	59.9; 98.4
--------	5459/22	98.4; 84.35

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Fig. 1

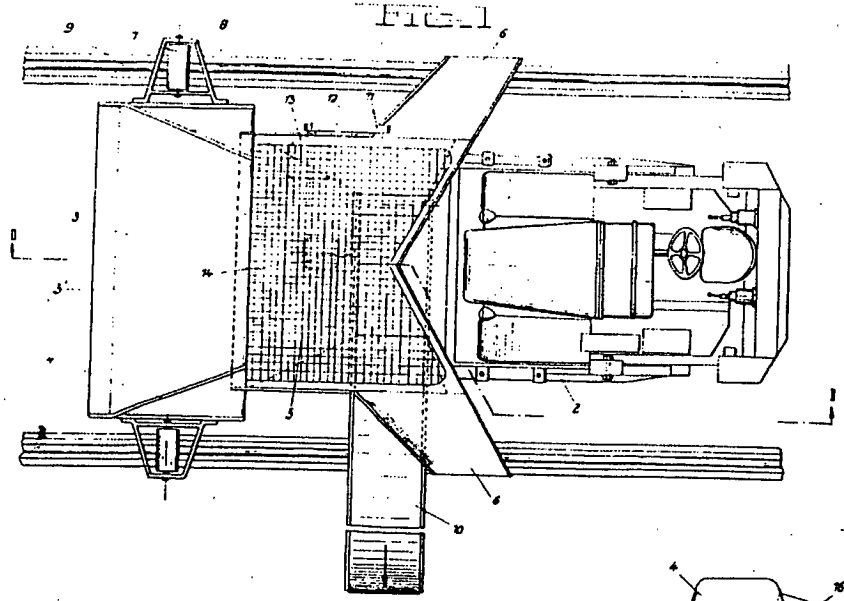

Fig. 2

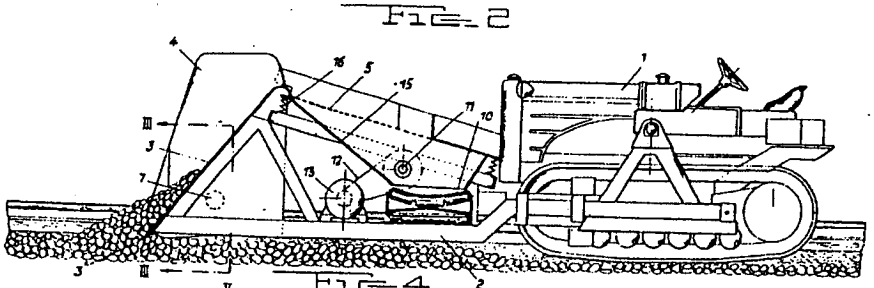

Fig. 4

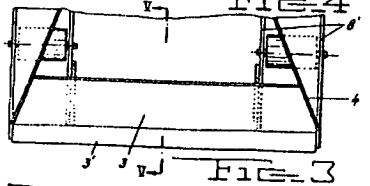

Fig. 5

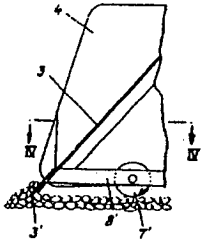

Fig. 6

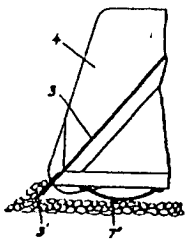

Fig. 3

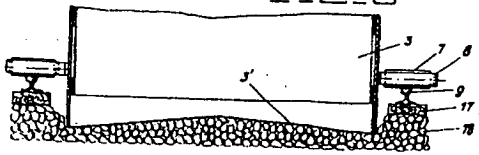

Fig-7